EPA Region 7 TMDL Review

TMDL ID	307	*Water Body ID*	Smoky Hill River Main Stem Segments 9, 10, 12, 13, 14, 16, 17, 19, 20, 21-part,
Water Body Name	Smoky Hill River (Trego)		
Pollutant	Dissolved Oxygen		
Tributary	Tributary segments attached to decision document		
State	KS	*HUC*	10260003, 10260005
Basin	Smoky Hill/Saline River		
Submittal Date	07/09/2004		
Approved	Yes		

Submittal Letter

State submittal letter indicates final TMDL(s) for specific pollutant(s)/ water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.

A letter was received by EPA on July 9, 2004, formally submitting this TMDL document for approval under Section 303(d); a revision of this TMDL was received July 29, 2004.

Water Quality Standards Attainment

The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.

The Kansas Water Quality Standard for Dissolved Oxygen is not less than 5 mg/L (KAR 28-16-28e[c](2)(A)). Reducing the amount of BOD entering the stream should improve in stream dissolved oxygen concentrations resulting in WQS attainment.

Numeric Target(s)

Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

The desired endpoint is to maintain average BOD concentrations at site 550 at or below 2.0 mg/L for flows less than 1.5 cfs, average BOD concentrations at site 550 at or below 2.0 mg/L for flows between 1.5 and 50 cfs, and reducing BOD levels to 4.5 mg/L for flows greater than 50 cfs. BOD is a commonly used surrogate for predicting DO in a stream and is appropriate for this TMDL to ultimately achieve WQS for DO of 5.0 mg/L. Previous findings indicate 7% of samples were under the state WQS of 5 mg/L for DO and these excursions were throughout the year.

Link Between Numeric Target(s) and Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.

Targets are established based on BOD/DO relationships for the stream. Ammonia, biochemical oxygen demand (BOD) fecal coliform bacteria (FCB), water temperature, turbidity, nitrate, phosphorus, and pH data from site 550 were divided into comparison categories using the critical low flow and general temperature conditions associated with the DO excursions against the same flow conditions for DO compliant data. The data does not suggest a significant difference in the low flow conditions. There were significant differences in the high flow group for turbidity, phosphorus, and FCB, however, sample sizes were small and additional samples are needed to reach any conclusive results.

TMDL load duration curve methodology presents a comparatively simple empirical approach to achieving WQS. The flow duration curve is a cumulative frequency curve that shows the percent of time during which specified discharges were equaled or exceeded in a given period. KDHE used daily flow records for evaluating water quality at station 550. By representing a long-term flow, along with the applicable monitoring data, the curves can be used to predict the distribution of future flows for meeting State WQS for DO. Evaluation shows sum of all allocations and implicit margin of safety will not exceed the loading capacity.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.

There is 1 NPDES permitted wastewater discharger in the watershed (Oakley Wastewater Treatment Facility). There are 39 registered, certified or permitted livestock operations, primarily located in the middle or upper end of the watershed. Ten of the facilities are

NPDES permitted and are non-discharging facilities. Land use is 39% grassland and 59% cropland. The watershed's population density is low (1-6 persons/square mile). Failing on-site waste systems can contribute oxygen demanding substance loadings but given the small rural populations, its effects are limited. The source analysis has reasonably accounted for all expected sources contributing to the impairment.

Allocation

Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.

The allocations in this TMDL represent the results of instream modeling as to the expected relationship between physical factors, organic matter and DO. Reducing the amount of BOD entering the stream should improve instream dissolved oxygen concentrations resulting in WQS attainment.

WLA Comment

Assigned WLA for the single permitted discharging facility is 6.7 lbs/day BOD across all flow conditions.

LA Comment

The LA is to maintain instream BOD concentrations of 2.0 mg/ L at site 550 across flows less than 1.5cfs, maintaining average historic BOD levels at 2.0 mg/L for flows between 1.5 and 50 cfs, and reducing the instream BOD levels at 4.5 mg/L for flows in excess of 50 cfs. The LA is zero for flows between 0-0.62 cfs, since these flows are entirely effluent created.

Margin of Safety

Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.

MOS is implied based on conservative assumptions that holding BOD levels to 2 mg/L ensures DO excursions will not occur from organic loading over 95% of the long term hydrologic conditions. For flows greater than 50 cfs, the average BOD concentration for compliant samples taken under similar high flow conditions was 4.76 mg/L.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).

Seasonal variation is accounted for by this TMDL in that the load curve represents all flow conditions and since the TMDL endpoint is sensitive to the low and high flow conditions, usually occurring in the spring or summer/fall.

Public Participation

Submital describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).

Public meetings were held in Hays, Kansas to discuss the Smoky Hill/Saline River Basin TMDLs on October 3, 2002, January 7, 2003, and March 5, 2003. Public hearings were held on the Smoky Hill/Saline Basin TMDLs in Hays on June 4, 2003 and the Basin Advisory Committee also met to discuss the TMDLs on October 3, 2002, January 7 and March 5, 2003. A public internet web site is established at http://www.kdhe.state.ks.us/tmdl/.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).

This TMDL is phased and KDHE will continue to collect bimonthly samples at station 550 in 2004. Should impaired status remain, more intensive sampling will be conducted, endpoints will be refined, source assessment, allocation and implementation activities will follow between 2008 and 2012.

Reasonable assurance

Reasonable assurance only applies when reduction in nonpoint source loading is required to meet the prescribed waste load allocations.

Reasonable assurance is not required for this TMDL because permit limits derived from the WLA do not depend on reductions from NPS, nonetheless the TMDL describes numerous authorities and funding through the Kansas Water Plan.